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THE DECREASE IN THE PROPORTION OF CHILDREN.

IN respect to the increase or decrease of different classes of the population the figures of the Eleventh Census present certain variations from previous or recognized proportions. Some of these peculiarities have been commented upon by various writers, who generally accept the fact and advance opinions more or less hypothetical as to the cause.

Of the analytical results of the census, those relating to mortality and vital statistics disclose in the greatest degree the effect of variations in the population figures, and direct attention to details not apparent in any study of the latter by themselves. Particular importance attaches to a peculiarity in the figures showing the age distribution of the population, because of its effect upon the computation of birth rates, of life tables and of death rates among children. This peculiarity is a great decrease in the proportion of children under five years of age during the decade 1880–1890, the proportion of this class in each 100,000 of total population having fallen from 13,786 in 1880 to 12,223 in 1890. The extent of this diminution may perhaps be better appreciated when it is stated that there is an apparent loss of over 1,000,000 children under five years of age, as compared with the proportion in 1880. The loss is general throughout the country, every state being affected to a greater or less extent, excepting some of the western states and territories which in 1880 were of comparatively recent settlement and had, naturally, a small proportion of children. There are, however, great differences in the ratios of decrease in contiguous states of more settled conditions and in different classes of population in the same state.

The proportions of children under one and under five years of age, per 100,000 population of known ages, on June 1, 1880, and on June 1, 1890, with distinction of color, are shown in the following table:

	UNDER ONE.			UNDER FIVE.		
	Total.	White.	Colored.	Total.	White.	Colored.
1880 . . .	2,887	2,808	3,394	13,786	13,364	16,502
1890 . . .	2,508	2,477	2,733	12,223	11,993	13,887
Decrease. .	379	331	661	1,563	1,371	2,615

According to these figures, there were 1563 less children under five years of age in each 100,000 of population in the United States on June 1, 1890, than on June 1, 1880. The whites show a loss of 1371 and the colored of 2615 in each 100,000. The corresponding losses in the proportions under one year of age were : total, 379 ; white, 331 ; colored, 661. The greatest loss at each age in both white and colored occurred in those states and divisions having the largest percentage of colored population.

The following table shows, by grand divisions, the loss in the proportion of each class per 100,000 of the population from 1880 to 1890:

	UNDER ONE.			UNDER FIVE.		
	Total.	White.	Colored.	Total.	White.	Colored.
No.AtlanticDiv.	219	215	511	1084	1066	2182
So. " "	557	488	659	2261	1870	2824
No. Central "	319	313	575	1355	1329	2596
So. " "	609	566	729	2116	1855	2612
Western "	254	337	56	1215	1569	499

The population figures also show, not only that the proportion has decreased generally, but also that in twelve of the states —namely, Delaware, District of Columbia, Indiana, Maryland, Mississippi, New Hampshire, North Carolina, Ohio, South Carolina, Tennessee, Vermont and Virginia —there is an absolute decrease in the number of children under five years of age as compared with 1880. These states show as to total population a positive gain of 1,800,478, or 13.15 per cent ; and, at the same time, as to children under five, an actual loss of 48,827, or 2.53 per cent. Of this loss 21,437, or 43.90 per cent, were under one year of age. The figures for these states are given in the following table :

STATES.	POPULATION — ALL AGES.			POPULATION — UNDER FIVE.		
	1890.	1880.	Increase.	1890.	1880.	Decrease.
Aggregate . .	15,497,141	13,696,663	1,800,478	1,928,045	1,976,872	48,827
Delaware . . .	168,493	146,608	21,885	17,957	18,335	378
Dist. of Columbia	230,392	177,624	52,768	20,303	20,635	332
Indiana . . .	2,192,404	1,978,301	214,103	254,441	257,633	3,192
Maryland . . .	1,042,390	934,943	107,447	120,976	122,954	1,978
Mississippi . .	1,289,600	1,131,597	158,003	191,815	195,876	4,061
New Hampshire	376,530	346,991	29,539	30,321	30,573	252
North Carolina .	1,617,947	1,399,750	218,197	233,014	233,117	103
Ohio	3,672,316	3,198,062	474,254	399,617	405,427	5,810
South Carolina .	1,151,149	995,577	155,572	169,941	173,551	3,610
Tennessee . .	1,767,518	1,542,359	225,159	244,522	249,993	5,471
Vermont . . .	332,422	332,286	136	29,873	34,091	4,218
Virginia . . .	1,655,980	1,512,565	143,415	215,265	234,687	19,422

It is evident that a diminution in the proportion of children might be caused by either a decrease in the birth rate or an increase in the death rate. Upon the face of the census returns both these causes seem to be revealed. But such a marked falling off as the table shows in the number and proportion of children during a single decade involves a change in the death rate or birth rate, or both, of a most alarming character. Yet the fact of such change has generally been accepted, and much speculation has been indulged in as to the causes underlying it. Attention may perhaps be more profitably devoted to the statistics on which the fact itself depends.

Of the two factors concerned the birth rate has been more generally discussed, although it is the most incomplete and unsatisfactory of all the branches of vital statistics. Births were not specifically reported by the census enumerators in either 1880 or 1890, no inquiries relating thereto being included in any of the schedules. The number of births, as stated in the census reports, was *estimated* by adding to the living population under one year of age on June 1, 1890, as shown by the population figures, the number who were born during the year preceding that date, but who also *died* before June 1, as shown by the return of deaths. The correctness of the estimate as to the number of births, and consequently of the birth rate, depends therefore upon the completeness of the returns of both of these items. The return of deaths, however, except where secured by copying local registration records, is known and acknowledged to be very incomplete, and more so in 1890 than in 1880. This known deficiency in the return of deaths has been generally regarded as the principal cause of the incompleteness in the estimate of births.

The number of births in the United States, as estimated in 1880 and 1890, is shown in the following table :

YEARS.	POPULATION UNDER ONE.	BORN AND DIED.	BIRTHS.
1880	1,447,983	104,314	1,552,297
1890	1,566,734	104,087	1,670,821

Considering the figures for 1890, as given in this statement, a short calculation shows that the "population" factor represents about ninety-four per cent and the "born and died" about six per cent of the whole, the ratio being about 15 to 1 ; hence a small percentage of deficiency in the enumeration of children of this age would have a much greater effect on the estimated number of births than a larger percentage of deficiency in the return of deaths. It will also be seen that, as the population under one year of age constitutes nine-tenths of the dividend in computing the birth rate and all of the divisor in computing the death rate at this age, any deficiency in the number would give too low a birth rate and too high a death rate for this class.

Regarding the population generally, there are but few data available for determining the error in the census returns ; but for the children under one year and under five years of age the registration records of births in certain states and cities furnish an independent but parallel line of data for testing the accuracy of the figures as given for those places ; and, while it is possible that an exact knowledge of the facts for the whole country would show a slightly increased rate of infantile mortality and a somewhat diminished birth rate, a careful analysis of the figures and a comparison of the population at certain ages with the births and deaths registered in localities maintaining a fairly accurate system of registration, will show that there are also very decided omissions in the enumeration of children.

Bearing in mind the fact, familiar to all who have made any study of vital statistics, that the registration of births is always less complete than that of deaths, it would seem to be a logical conclusion that the number of children under one year of age upon a certain date in any locality should not be less than the number of births registered during the year preceding that date *minus* those who died before the date fixed.

Of the several states Massachusetts has probably the most complete registration records. The machinery of the enumeration was practically the same, so far as supervision was concerned, as that employed in 1880 and in the intervening state census; and it is probable that the defects in the enumeration in that state are at least as slight as in any other. For these reasons the registration records of births and deaths in Massachusetts, in connection with the census compilation of deaths, based on copies of the same records, are used in the comparisons made herein.

The following table shows for the state of Massachusetts the deaths and death rates under one and under five years of age, with the births and birth rates per 1000 of population, as computed upon the United States census figures for 1880 and 1890:

BIRTHS, DEATHS AND RATES.	UNITED STATES CENSUSES.	
	1880.	1890.
Births	41,338	48,156
Birth rate . . .	23.18	21.51
Deaths under 1 . .	5,891	8,792
" " 5 . .	10,219	13,336
Death rate under 1	156.73	204.26
" " " 5	56.99	65.45

Taking these figures as they stand, they show an increase in the death rate for both ages and a decrease in the birth rate.

The following table shows the number and proportion of children under five years of age in Massachusetts, according to the census figures of 1880 and 1890, with the variation in proportion :

AGES.	POPULATION.		NUMBER AT EACH AGE IN 100,000 OF ALL AGES.		DIFFERENCE IN PROPORTION.
	1880.	1890.	1880.	1890.	
All ages	1,783,085	2,238,943			
Under 5 years . . .	179,307	203,758	10,056	9,101	— 955
Under 1 year	37,587	43,043	2,108	1,922	— 186
1 to 2 years	33,051	28,462	1,854	1,271	— 583
2 " 3 "	36,424	46,726	2,043	2,087	+ 44
3 " 4 "	35,989	44,367	2,018	1,982	— 36
4 " 5 "	36,256	41,160	2,033	1,838	— 195

From these figures it would appear that, while the aggregate population of the state increased 25.57 per cent in the decade, the increase in the number of children under five years of age was but 13.64 per cent, and the increase in the number under one but 14.52 per cent, while the proportion of children under five fell from 10,056 in each 100,000 in 1880 to 9101 in 1890.

The forty-ninth registration report of Massachusetts gives the number of births in the state during the year ending May 31, 1890, as 57,813, and the number of deaths under one year of age, exclusive of stillborn, as 9330. By taking the census return of deaths, based upon copies of the same registration records, and making a tabulation to show, for those who were born during the year, the month of death by the month of birth, it becomes possible to approximate closely the number of survivors on June 1 out of those born in each month of the year, and the actual number under one year of age on the day of the enumeration. The data available are therefore sufficient to determine very nearly the amount of error in the census figures given above, showing the population under one year of age in Massachusetts, the births as estimated, the birth rates and the death rates at this age. The following table shows the number of births registered in each month of the census year, with the number of deaths and the survivors out of those born in each month :

BIRTHS, DEATHS AND SURVIVORS.	BORN IN												
	Total.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mch.	Apr.	May.
Total Births	57813	4635	5070	5174	4944	4858	4712	4901	4947	4488	4891	4436	4757
Died in June	145	145											
" " July	336	150	186										
" " Aug.	458	116	165	177									
" " Sept.	478	80	110	121	167								
" " Oct.	388	41	65	68	76	138							
" " Nov.	333	18	29	42	55	56	133						
" " Dec.	369	17	29	36	41	38	57	151					
" " Jan.	538	34	32	37	49	48	56	89	193				
" " Feb.	425	19	31	22	29	28	36	48	59	153			
" " Mch.	552	31	36	30	42	47	29	49	60	74	154		
" " Apr.	549	18	32	32	25	33	20	52	58	58	72	149	
" " May	527	25	19	27	21	22	28	35	28	38	45	73	166
Total deaths	5098	694	734	592	505	410	359	424	398	323	271	222	166
Survivors	52715	3941	4336	4582	4439	4448	4353	4477	4549	4165	4620	4214	4591

The number of births registered includes only those born in the state; while the "born and died" includes a small number (41) of children of foreign birth, not distinguished by month of birth or death, which should be excluded; and the population returns also show a small number (498) of children of foreign birth which must be added to the survivors out of those born in the state, to give the living population under one year of age on June 1, 1890. The results are shown in the following statement :

CENSUS YEAR 1890.

Births registered		57,813
Born and died	5098	
Less foreign born	41	5,057
Survivors of native birth		52,756
Foreign-born children under 1 year		498
Total under 1 year		53,254
Population reported as under 1 year .		43,043
Deficiency		10,211

From this statement it appears that the number of children under one year of age, as given in the census reports, is less by

10,211 than the number of survivors out of those born during the year, the deficiency being equal to 23.72 per cent of the population reported.

In this statement no allowance has been made for any deficiency in the registration of births ; hence it is reasonable to suppose that the deficiency in the population presented in the table represents the minimum. Interstate migrations, being a small factor in this class of population, may be held to balance. It is claimed by the registration officers that the deficiency in the registration of births does not exceed two per cent ; if the number of births be increased by that amount, the gross deficiency for children under one year would be 11,367, or 26.41 per cent. It is probable that the actual deficiency in the population of Massachusetts reported as under one year of age is not less than twenty-five per cent in round numbers.

The same registration report gives the number of births during the census year 1880 as 42,053. Deducting from this the number of the "born and died" (exclusive of stillborn), namely, 3751, and adding 649 children of foreign birth, the total number of children under one year of age on June 1, 1880, would be 38,951. The number reported in the population was 37,587, showing a deficiency of 1364, or 3.62 per cent, in the population as compared with the survivors out of those born in the census year 1880. Assuming the same deficiency as above in the registration of births, the deficiency in the population under one year of age for 1880 would be about five per cent.

There is always considerable error in the age distribution of the population as reported, of adults as well as of children, owing to the universal tendency to state ages in round numbers; and a deficiency in the number of children under one year of age is generally expected, upon the theory that children of ten or eleven months will be reported as one year old. The estimated deficiency of twenty-five per cent in the population of Massachusetts reported as under one year of age, is perhaps partly due to the tendency mentioned. The effect of this would be to increase the number between one and two years of age beyond its normal proportions; and if such an increase were apparent in the figures, it might be held conclusive of the theory referred to. In fact, however, it appears from the table of proportions given for single years that there is a greater loss for those between one and two years than for those under one.

The registration reports also afford a means of determining the deficiency in the population under five years of age, not, indeed, so accurately as in the case of those under one — since the census returns were made only for the single year ending May 31, 1890, and because the data concerning those who were born and died in each of the other years are lacking — but still sufficiently to show the error within certain reasonable limits. The error in the age distribution by single years, however, cannot be calculated from the data available.

The children under five years of age on June 1, 1890, were necessarily the survivors out of those who were born during the five years preceding that date. The number of births in the state during this period and the number dying each year from birth to five years of age are shown in the registration reports; and these numbers, together with that for the foreign-born population under five, as shown by the census figures, furnish the data for our comparison, some correction being necessary to make the registration figures for calendar years correspond in time with the census results.

The following table shows the births during the years 1886–1890 and the deaths at ages which would bring the births within the five-year period, excepting the highest age in each year, for which a correction is necessary:

YEARS ENDING MAY 31ST.	BIRTHS.	DEATHS UNDER 5 YEARS, WITH AGES AT DEATH.					
		Total.	Under One.	1–2.	2–3.	3–4.	4–5.
1886	49,021	7,721	7,721				
1887	52,060	10,210	8,137	2,073			
1888	53,437	12,000	8,668	2,232	1,100		
1889	56,175	13,037	8,972	2,208	1,113	744	
1890	57,813	13,743	9,330	2,173	1,037	688	515
Total	268,506	56,711	42,828	8,686	3,250	1,432	515

The number of deaths shown in this table is not strictly comparable with the number of births in the five years: first, because a part of those dying in the year 1886 under one year of age were born in the previous year (1885); second, because part of those dying in 1887 between one and two years of age were likewise born in 1885, and so on for the highest age in each year; and, finally, because the deaths include children born in other countries or in other states. It may be assumed, however, that the proportion of these classes was much the same in each year; and the general effect may be calculated by applying the known proportion in the census figures, without making corrections for each detail.

Summing up the numbers at the highest age in each year, we have included in this table 12,153 deaths of persons born either in 1885 or 1886; and, as the number of births in each of these years was about the same, 6000 would approximate with sufficient accuracy the number of these that were born in 1885, and must therefore be excluded from the deaths.

According to the census returns for 1890 there were 387 children of foreign birth who died during the census year at ages under five; and as the proportion of living children of this class was almost identical in 1885 (state census) and in 1890, it is a reasonable presumption that the ratio of deaths of foreign-born children in each year was about the same as in 1890. Applying this ratio to the deaths stated in the table above, we have a total of 1329 deaths also to be excluded, as not occurring out of the stated number of births.

The population reported as under five years of age on June 1, 1890, was 203,758, of whom 8029 were of foreign birth.

The deficiency in the population of Massachusetts reported as under five years of age thus appears to be 23,396, or 11.48 per cent; and this is the minimum, no allowance having been made for any deficiency in the return of births with which it is compared. If, as in case of those under one year of age, the estimated deficiency of two per cent in the registration of births is allowed, the percentage of deficiency in the population under five years would be 14.12 per cent. It is certainly not less than fourteen and probably exceeds fifteen per cent.

The tabulated statement of the results of the foregoing is as follows:

YEARS 1886–1890.

Births			268,507
Deaths under 5 years. Total		56,711	
" of those born previously	6,000		
" " foreign born	1,329	7,329	
" corrected			49,382
Survivors			219,125
Foreign born, living			8,029
Total under 5 years			227,154
Population reported			203,758
Deficiency			23,396

The corresponding deficiency in the census figures for 1880 appears to be about the same, proportionally, as in case of those under one year of age, which would make it 2.80 per cent.

The following table shows the result of applying the deficiency percentages determined above to the figures for Massachusetts, as given in the census reports:

Population, Births, Deaths and Rates.	Reported.		Corrected.	
	1880.	1890.	1880.	1890.
Population	1,783,085	2,238,943		
Under 1 year	37,587	43,043	39,466	53,804
" 5 years	179,307	203,758	184,328	232,284
Propor. per 100,000				
Under 1 year	2,108	1,922	2,213	2,403
" 5 years	10,056	9,101	10,338	10,375
Births	41,338	48,156	43,217	58,902
Birth rates	23.18	21.51	24.24	26.31
Deaths, under 1 year	5,891	8,792		
" 5 years	10,219	13,336		
Death rate per 1000 pop.				
Under 1 year	156.73	204.26	149.27	163 41
" 5 years	56.99	65.45	55.44	57.41

From this table it will be seen that, when the numbers of children under one and under five years of age are increased by the amount of the deficiency calculated above, the proportions at each age show an increase over the proportions in 1880, this increase being greatest in respect to those under one. There appears also an increased instead of a diminished birth rate for the census year 1890, which difference accounts for the increase in the proportion of those under one in that year. The death rate remains for both ages slightly higher than in 1880, but the difference is probably due more to the conservative estimate of the deficiency in the population of these ages in 1890 than to any actual increase in the death rates.

Upon the basis of a fourteen per cent deficiency in the number of children under five in 1890, the correct number at this age appears to be 232,284; and if we apply the corrected proportion in 1880 (10,338 per 100,000) to the aggregate population of the state in 1890, we get 231,462 as the number under five years of age — which is a very close approximation.

At the beginning of this discussion it was stated that there was an apparent loss of 1,000,000 under five years of age in the reported population of the United States, in comparison with the proportion existing in 1880; and it was assumed, on reasonable grounds, that the actual deficiency would not be less for the whole country than it was in Massachusetts. In the following table an application of the results obtained for Massachusetts is made to the figures reported for the United States.

Population and Proportion.	Reported.		Corrected.	
	1880.	1890.	1880.	1890.
Population	50,155,783	62,622,250		
Under 1 year . . .	1,447,983	1,566,736	1,520,382	1,958,420
" 5 years. . .	6,914,516	7,634,693	7,108,122	8,703,550
Proportion:				
Under 1 year . . .	2,887	2,502	3,031	3,127
" 5 years . .	13,786	12,192	14,172	13,898

From this table it will be seen that the difference between the number of children reported as under five years of age (7,634,693) and the number estimated upon the basis of the fourteen per cent deficiency shown for Massachusetts (8,703,550) is 1,068,857. If we calculate the deficiency upon the basis of the corrected proportion in 1880 (14,172 per 1,000,000), we get a difference of 1,240,132, indicating a greater deficiency in the remainder of the United States than is found in Massachusetts.

The deficiency in the return of deaths for the greater part of the United States precludes any determination of the comparative death rates of children for the country as a whole, or in most of the states. This deficiency is admitted, and is guarded against in the analysis of the census figures relating to mortality and vital statistics, the death rates being computed only for localities in which the return of deaths was secured from registration records — such as the New England states (except Maine), New York, New Jersey, Delaware, the District of Columbia, and the larger cities of the country, which cover, generally, the areas having low birth rates and a high rate of mortality among children. The conclusions derived from the comparisons herein made indicate, however, that the defects in the return of deaths are overshadowed by the defects in the enumeration of the population, and that with a correct enumeration the seeming decrease in the birth rate and the increase in the death rate of children would disappear.

The foregoing discussion has been confined to a test of the accuracy of the census enumeration of the population in the early years of life. The registration data with which the census figures are compared must be admitted to be more accurate than any enumeration of the population can be made under the present system, and the figures presented justify the conclusions reached as to the percentage of children omitted. No analogous conclusions, however, are to be drawn as to other periods of life. It is probable that the omission is much greater in the case of those under five years than for those of any similar period above that age.

If the conclusions reached above are accepted, the questions will naturally arise : Why was the enumeration more deficient in 1890 than in 1880? and why was the omission greater in the enumeration of children than of adults?

Of a variety of causes operating to produce the effects noticed, the most potent, comprehensive and simple was that too much was expected of the enumerators for the compensation accorded them. The schedules were too numerous, the inquiries too extended, the enumeration districts too large, the supervisors too remote, the time for preparation too short and the pay too small. The enumerators speedily discovered that there was no money in their task. This being the case, it was natural that in an army of 45,000 enumerators, selected in the way they were, there should be many who were inclined to skip the difficult or unpleasant parts; and an inclination to slight the work for any cause would naturally be exercised against unhealthy, unsavory localities — the dwelling places of the poor. It was among this class of population that the greatest omissions undoubtedly occurred, and it is this class which has the greatest proportion of children. It is safe to say that until the system and conditions of our census-taking are changed or the inquiries largely restricted the enumeration cannot be made accurate.

It will be observed that the deficiencies noted above are not due to defects in the office work of compilation. As heretofore organized, the census office has had faults enough — inevitable faults — arising from the lack of experience in the working force; but these have tended principally to delay the results and increase the expense of compilation. After the necessary experience has been gained, the work has generally been all that could be expected; but the most efficient force, properly organized and capably directed, can do no more than make a correct compilation of the returns.

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